

# ICTs in Micro-enterprises: Does it make a difference?

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## Abstract

In the United States, there are over 25 million microenterprises, comprising 88% of all businesses. These businesses with five or fewer employees are resource-constrained – with one of the many areas being the lack of technical skills. Their inability to acquire and use these skills causes them to be at a disadvantage to larger corporations. In this study, we show how, using a customizable technology-based assistance approach can facilitate the adoption and use of Information and Communication Technologies (ICT) in micro-enterprises. An action research methodology was used to investigate two microenterprises in Western New York during a five-month timespan. The contribution of this study is in understanding the nature of any impact that may come about in resource-constrained micro-enterprises as a result of ICTs.

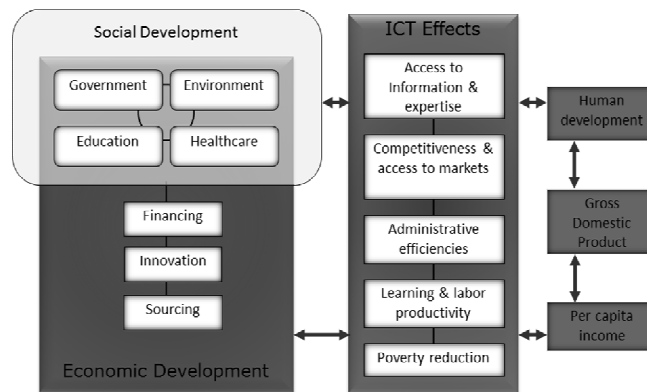
## Introduction

In the United States, there are over 25 million microenterprises, which encompasses 88% of all businesses. In New York State alone, 90% of all businesses are microenterprises. Historically, micro-enterprises have been considered the backbone of the U.S economy. Micro-enterprises have the potential to serve as the seedbed for economic development (Grosh et al. 1996). Yet many microenterprises are hindered from growing and functioning efficiently by an inability to use information technology effectively (Honig 1998; Hyman et al. 1998). Although, it is not the primary engine of growth, the micro-enterprise sector is very important for broad-based development, and for basic household economic survival (Liedholm et al. 1999). Researchers and development agencies acknowledge that ICT can play an important role in facilitating development. Steinberg (2003) suggests that the high versatility of Information and Communications Technologies (ICTs) have the potential to address a country's development strategies - provided an enabling environment exists (Steinberg 2003). Researchers in the field of Information Technology for Development (ITD) have investigated various ways and in various scenarios the manner in which ICT may help to bring about development. There is also some research that suggests the benefits of ICT use within small businesses. Businesses can grow at a rate of 3.4% faster in terms of sales when email is used for customer communication (Qiang et al. 2006). Although current literature supporting utilization of technology by small businesses exists, in practice, this is not the scenario in the case of micro-enterprises. Microenterprises, which are businesses with five or fewer employees, are resource-constrained – with one of the many areas being the lack of technical skills. Their inability to acquire and use these skills causes them to be at a disadvantage to larger corporations that possess the finances and technical acumen to efficiently run Information Communication Technologies (ICTs). In a study by Qiang *et al* (2006) it was shown that among the micro firms, only 27 percent use e-mail and 22 percent use Web sites to interact with clients and suppliers. And so Qiang et al. (2006) pose the notion that: If computer use affects firm productivity and ICT expands networking within sectors and industries, the micro firms may not be benefiting from these externalities. Subsequently the research question being addressed in this study is, *what is the impact of Information Technology adoption and use in microenterprises?* In addressing this question, an action research methodology was used to investigate two microenterprises in Western New York during a five-month timespan. The contribution of this study is in understanding the nature of any impact that may come about in resource-constrained micro-enterprises as a result of ICTs.

## Background

Many ICT adoption challenges stem from the very nature of microenterprises. A company of one to five employees, one run by a proprietor of limited means, may want for the depth and breadth of skills necessary to gather business intelligence, solve problems, (Qureshi et al. 2009), and the ability to access to networks of capital and professional services (Grosh et al. 1996). How do microenterprises compensate for their deficiencies? In their study of information systems for rural micro-enterprise in Botswana, (Duncombe et al. 2002) found that these businesses filled in the gaps with information from localized, informal social networks. This information was of poor quality, and difficult to obtain consistently (Southwood 2004; Matthews 2007). Lack of information, against the backdrop of an enterprise's constantly being on the verge of failure, can foster risk averse and/or fearful behaviors; in two related studies by Wolcott et al. (2007) and Qureshi et al. (2008), it was seen that a group of microenterprises were awarded certain technologies through a technology grant program but even after six months, the boxes containing the new ICT devices were unopened. The researchers in those studies discovered that although almost all the micro-entrepreneurs realized that technology can help their business in some way, this realization was not sufficient to drive them or motivate them to incorporate and use the new ICT. "Irrational choice" would seem to be incompatible with traditional theories of technology acceptance (Davis 1989) and the UTAUT (Venkatesh et al. 2003), that presume recognition of benefit/potential benefit is equivalent to adoption. Such theories are organizationally situated, and difficult to apply in the individual case. Although the micro-entrepreneur's technological situation might seem, facially, to be dire, it is important to understand that micro-entrepreneurs are not in need of the *latest* technologies, but rather simple tools that will foster growth. According to Qureshi and York (Wolcott et al. 2008), there is empirical evidence that shows how ICT can help SMEs and microenterprises to increase business profitability through higher sales levels and cost savings. One of the greatest potential benefits of technology usage by microenterprises is access to new markets, made possible due an increase in internet usage and e-commerce worldwide (Qureshi et al. 2007). Training and use of good software further promote growth (Harrison et al. 1997); it may be helpful to underscore in training the advantages of business to business commerce (Molla et al. 2005).

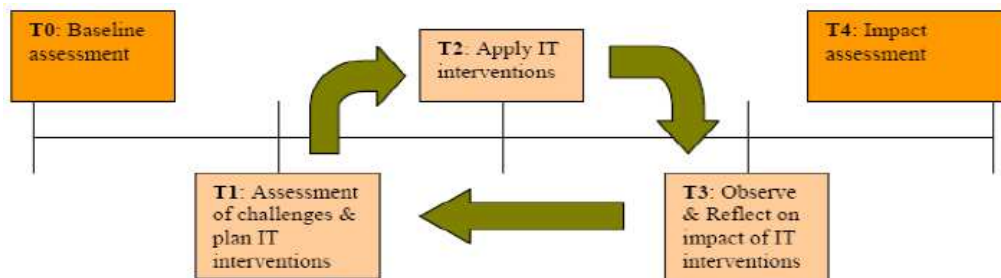
From a macroeconomic perspective, ICT innovations have the potential to enhance economic growth via self-reinforcing cycles of disruptive change (Prendergast 2006), in which ICT adoption decisions serve as the basis for new business opportunities (Kamal et al. 2009). Steinberg (2003) suggests that the high versatility of ICTs have the potential to address a country's development strategies - provided an enabling environment exists. In this vein, this research will draw upon the field of Information Technology for Development (ITD) to understand and assess the impact of ICTs in micro-enterprises. The field of ITD is built on this notion and entails the implementation, use and management of Information Technology infrastructures to stimulate human, social and economic development (Qureshi 2005). IT for Development research is not limited to developing countries and considers communities and regions in which people have limited access to funds, social services and education needed to sustain them. Technologies such as the cell phone which is now considered one of the most essential pieces of technology to humans around the world can be utilized in its simplest form to assist the rural poor in underserved regions. The United Nation's 2003 report on e-commerce and development mentions cost reductions, reduced or transformed use of intermediaries, and price transparency and formation, as the three main benefits from e-markets and online auctions for developing countries. Qureshi (Qureshi 2005) developed a model of Information Technology for Development (Figure 1) that identifies interactions that take place among social and economic development, ICT effects, human development, Gross Domestic Product and Per capita income; this model shows how e-commerce can be used to reduce the digital divide. In the micro-enterprise context it gives entrepreneurs the opportunity to "reduce costs of doing businesses, reduce use of intermediaries, and increase price transparency and negotiation" (Qureshi et al. 2007). We use the Qureshi (2005) model to make sense of the impact of ICTs in micro-enterprises.



**Figure 1. Model of IT for Development (Qureshi 2005)**

## Methodology

This study uses an inductive interpretive case study (Walsham 1995) to understand how micro-enterprises may adopt ICT to grow their business and facilitate development. An action research methodology (Baskerville, 1999; Zuber-Skerrit, 1991) is used to apply ICT interventions within two microenterprises in Western New York, a region known for its high poverty levels and lack of resources, and the results analyzed. The research design used is shown in Figure 2 below. As seen in the Figure 1, there are five distinct stages at which activities will be conducted.



**Figure 2. Research design**

At T0, the researcher will interview the micro-entrepreneur to understand their past, present, and future use of technology and how the owner thinks ICT could benefit the business. Stages T1 through T3 comprise the action research cycle that will be conducted. At T1, the researcher will once again meet with the micro-entrepreneur to inquire about any of the immediate ICT needs and also get an in-depth understanding of the business. Equipped with that information along with the information obtained from the interviews at the T0 stage, the researcher will then plan what type of ICT intervention would be appropriate to apply to the micro-enterprise. At T2, the actual ICT interventions will be applied. At stage T3, the researcher will evaluate whether the ICT interventions applied to the microenterprise actually meets and/or solves the needs expressed by the micro-entrepreneur. If not, then modifications are made and additional ICT interventions are applied. Iteration between stages T1 through T3 represents the cyclical nature of the action research approach. At T4 after the action research cycle is over, the researcher sits down with the micro-entrepreneur and interviews them again to inquire in what ways the ICT interventions impacted their businesses. The researcher will then integrate all the data from the interviews and observations and carry out a case analysis to discover how ICT may be adopted by the micro-enterprises and may impact development.

## Case Studies

### **Case 1: AC (Carpet cleaning business)**

AC is a small carpet-cleaning business run by a husband and wife. This company has been in operation since 1991. The business's main goal is to "do good work, make sure the customers are happy and to grow as a business, but not too large". The owner's husband used to work for a carpet cleaning business and when that company went out of business, they sold him the client list and the equipment that he needed to continue this service to customers. The owner of AC knows that technology can help businesses, but she is afraid to adopt new technologies because she feels that if she is not in control of it, that it can ruin her family business.

#### **To: Baseline Assessment**

**ICT Perceptions:** The responses from executing the baseline assessment of AC revealed that the owner believe that ICT can help market her business, but only if it is manageable for her and her husband to use. Technology is both a "curse and blessing" according the owner of AC. The capabilities that technology can do in terms of attracting customers and marketing a small business are vast. However, the owner of AC realized that with such a vast opportunity comes a time commitment. The owner of AC knows how time consuming a website and a Facebook page can be, but she knows it will be worth it in the end if she pays attention to it. If an error occurs or competitors try to see who AC's customers are, that is when technology becomes a curse. Overall, the owner of AC believes technology can be positively used to promote business growth, but adopting it can be fearful and risky.

#### **T1: Assessment of Challenges and Plan ICT Intervention**

**Historical and Social Context:** The owner and her husband had been operating primarily without direct interaction with technology regarding their business. The owner has been using basic technological skills, like surfing the web and using email. However, modern business technologies such as social media and a business website have become overwhelming and frightening. For example, the owner of AC fears that competitors will look on her social media pages and steal her customers online. The owner of AC realizes that many businesses are using social media, so she decided to make an account for her business a year ago. Another reason why the business has not adopted ICT is due to time. They originally felt that maintaining a website and having a social media page would consume hours a day to maintain – however they later realized that for the scope of their business, ICT will not be as consuming as they thought.

**Plan ICT Interventions:** AC had a website built for them a few years ago. Although this website was functional, no maintenance has been performed by either owner for months. The website was created and maintained by an outside source. Due to other obligations, AC could no longer receive help from this outside source and AC was left with the website code to be maintained by themselves. This caused the owner to become overwhelmed with technology, she did not know how to code and the product she was using was too complicated for a person with "average" computer skills. Additionally, AC has a Facebook account for the business. The page contains sections on "about us", "description of services", "contact information", and "pictures" (from jobs performed). Since the company began, all customer information and jobs were recorded in hard-copy form on paper. Based on this assessment, AC needed a way to create and edit their website. This solution must be user-friendly program since the owner does not possess any coding background. The website will function as the main electronic source of AC's services and information. With a more visible and current website, AC can access a wider customer base. Furthermore, AC needs a way to record customer information electronically. The owner of AC needed some form of email list for their customers. Another technological point was that AC used one desktop computer for holding pictures of the work they do. This computer is also used for personal use. Upon investigation, the computer had a number of viruses on it, causing pop-ups to occur and slowing down the computer. To efficiently maintain her website and business, AC needed virus protection software.

#### **T2: Apply ICT interventions**

The owner of AC has been provided with many new software upgrades for her business. First off, the owner was provided a new website building tool, Weebly, a user-friendly website provider with a drag-

and-drop setup. This online tool allows users with little to no training in web development to maintain their own website. Additionally, two anti-virus/anti-spyware programs were provided that removed a number of viruses on AC's computer. The final intervention was a simple database with filtering capabilities. This would drive the business's paper model of tracking customers to an electronic one. No additional *hardware* was needed for any of these upgrades provided.

The following interventions that were carried out for AC and can be viewed in table 1.

<b>Intervention</b>	<b>Initial Impact</b>
Create a website that is easy to update	The business owner now uses a new tool to develop new websites, webpages, and content on those pages. She has improved SEO and has a mobile-friendly website.
Install anti-virus scanners	The computer is much more protected from malware, spyware, Trojans, and other viruses.
Create an electronic database with filtering capabilities	The owner has less paper files, a more efficient member storage system, and an easier way to create a customer email list.

**Table 1. Interventions in AC**

### **T3: Observation & Reflection**

Over the course of the ten weeks during which the ICT adoption were being conducted, the owner of AC has shown dramatic improvements with operating Weebly to make changes to the business. The owner of AC has received hours of visual training and one-on-one demonstrations from a group of college IT students. These training sessions included many different tutorials on how to operate all the software and web tools given to help solve their problems. The majority of the time was spent on Weebly, going over many functions and designing the layout. After the first few training sessions, the owner of AC has shown more confidence in her use of technology. From fearful of technology to excited, this business owner needed encouragement and access to user-friendly tools to bring out her technical confidence.

Further training was provided on how to use anti-virus programs. The importance of having anti-virus programs was emphasized to the owner of AC. The process of how to download and scan AC's computer was demonstrated by the group of college students. The owner began to realize the threats of "hidden viruses". Her computer did not show signs of viruses (i.e. being slow), but after performing scans, she realized that viruses could still exist. During further training sessions, the owner spoke how she was performing virus scans weekly on her machine.

Finally, the owner has been trained on how to use *Microsoft Excel Starter* to maintain an electronic customer records file. The owner of AC was shown how to filter records in a spreadsheet. After the list was filtered, she expressed how she always wanted to send mass emails to target customers. The owner learned by herself (through browsing the Internet), how to filter out records by the date they last received a carpet cleaning. From this list, she easily highlighted the email column on her spread sheet and pasted them into an email client. The owner of AC was not overly "tech savvy" going into this intervention. She knew that technology really did set businesses apart in her market but she did not really know what to do. After weekly meetings, some helpful solutions and training, the owner has really hit the ground running. One huge factor that contributed to all of AC's success was the owner's *enthusiasm* and *determination*. There was never a time where it seemed that the owner of AC was underprepared or lacking motivation. The amount that she has learned will hopefully reflect all the hard work she has put into adopting ICT solutions. It was obvious from the first day of the ICT-intervention that AC saw the value in using ICT. The owner explained that the business was not bringing customers in via the Internet, which was a big concern. AC is doing well as a business, but they see how making a few ICT improvements could really push their business to the next level. The computer AC is using to maintain the website is also the owner's personal computer, so the anti-virus also affected outside the business work. The lack of any anti-virus program showed a lacked of infrastructure in the "IT Center" at AC. Additionally, now that AC is recording customer appointments on an electronic spreadsheet, AC has a much more accurate and efficient way to maintain customer records. The files on the computer were organized as an "IT Center". There were separate folders dedicated to the business, and several sub-folders pertaining to specific information, such as "commercial customers b and a [before and after] pictures".

## Case 2: RP (Florist)

RP is a florist that sells flowers and flower arrangements. This business strives to provide excellent customer service and a premium product. RP currently has five full-time employees and one part-time employee. The owner of RP has been in business for 40 years and is very experienced in floral work and common technology practices. The owner of RP benefits from belonging to a group of florists that share warehouses around the Western New York area. This allows customers to make distance purchases from RP, just in case they want a product delivered to a different town.

### To: Baseline Assessment

**ICT Perceptions:** The owner of RP revealed that he is knowledgeable in modern technologies and is always willing to learn something new. He realized the importance technology has on his business when he discovered that other florist have been adopting ICTs. He personally knows other local florists that have hardly any ICT and he expressed how those businesses are not doing as well as his own. The owner believes that keeping on top of technology is necessary for any type and size of business. According to the owner, if a business in today's era does not have *any* ICTs, they are very likely to fail.

### T1: Assessment of Challenges and Plan ICT Intervention

**Historical and Social Context:** In the past, the owner of RP has purchased used-computers from a local computer store near his business. He also utilizes a commercial company to run and maintain his POS (point of sales) system. RP's website is hosted and run by an outside company and the owner is very happy with their performance. RP's web presence however needs more Search Engine Optimization (SEO) work done. The owner stated that if he had someone to show him or a push in the right direction of technological choices and skills, he would be open for anything. The owner feels his business is currently doing well in its market reach and administrative efficiencies. This allowed him to proceed with competing against other florist.

**Plan ICT Interventions:** After reviewing the business needs of RP, it was quickly addressed that the main computer for RP was quite outdated. It was bought over a decade ago and all applications on the machine were running quite slow. Being able to speed up the computer or consider purchasing a new machine was almost necessary. Employees complain about the speed of the computer and always wished it were faster. None of the computers in RP had any form of virus protection, so a solution to this was to find a free antivirus that could be installed on multiple computers. As far as organization, the business's "IT center" was sloppy, wires were sticking out everywhere and cords were tangled. Furthermore, RP lacked in data protection. The computers in RP hold important customer and business information and no backup of these records were ever carried out. If a computer were to crash or break, crucial information might be lost with it. Being able to securely backup data is something that will keep RP more organized and protected.

### T2: Apply ICT Interventions

RP experienced several hardware and software upgrades throughout the course of the ICT assistance program. Mainly, the slow computer at RP was replaced with a new one. All of the data from the slow computer was transferred over successfully. The computers at RP had antivirus programs installed onto them and the owner learned a few tools that could speed up RP's computers. These tools addressed internet history, cookies, and disk fragmentation.

The following ICT interventions that were carried out for RP can be viewed on table 2.

Intervention	Impact
Transfer old data to new computer.	RP has a faster computer with the same data on it.
Cleanup laptop files and programs.	RP's laptop runs much more efficient and has organized folders.
Teach the owner of RP to understand and maintain cookies and browser history.	The owner knows how to clear history and cookies on his computer and smartphone.

Installed and showed owner how to use backup software to protect data.	Files that are used daily had a backup location.
Teach owner how to maintain a PC in terms of viruses and file cleanup.	The owner knows how to use CCleaner, Malwarebytes, AVG Anti-virus software.
Make sure that data was kept in more than one location (backup)	External hard drive holds a backup of crucial data.

**Table 2. Interventions in RP****T3: Observation & Reflection**

The owner of RP appeared to be confident with the technological decision throughout the entire IT assistance program. He is in charge of all technology that is purchased and he trains his employees if they need to use a particular technology on a daily basis. The owner was able to learn various antivirus programs quite easily; he was unaware of how many “undetected” viruses his machine had. He plans to run the virus scanners at least once a month. He also setup an automatic scan feature so his machine scans when it is turned on, however this feature is only set on his laptop. When it came to the decision to speed up his main store’s computer, the owner thought a good option was to buy new accessories and attach it to the existing computer. However, after calculating the costs, it was cheaper to buy a new computer than all of the “speed up” accessories. After purchasing the new computer, the owner of RP was trained on how to transfer data from one machine to another. He also grasped this technique quite quickly; this microenterprise owner was familiar with technology.

**Case Analysis**

In the T4 phase of our research design (Figure 2), the researchers carried out an impact assessment by going back to the two microenterprises 5 months after their initial ICT adoptions had been carried out. Our analysis of the observations is correlated to the ICT effects from the Qureshi (2005) model of IT for Development (Figure 1). Specifically, the ICT effects are: Administrative efficiency, learning and labor productivity, poverty reduction, competitiveness and access to new markets, access to knowledge and expertise. Table 3 below classifies some selected statements made by the owners of AC and RP from the impact assessment interview into the ICT effects categories. Following Table 3, is a detailed analysis of the impact in each of the microenterprises as a result of the ICT adoption.

Case 1: AC	Case 2: RP
<b>Administrative Efficiency</b>	
<p><i>“We are still in the process of updating our spreadsheet system of customer records, mainly to hold customer emails so I can mass email them special offers.”</i></p>	<p><i>“I do a lot ordering now by email and it saves me time when I can access my email more quickly.”</i></p> <p><i>“We are always using it [the computer] and it has been running great with everything.”</i></p> <p><i>“We now can have multiple tabs open at the same time.”</i></p>
<b>Learning &amp; Labor Productivity</b>	
<p><i>“I even began teaching my husband.”</i></p> <p><i>“I learned how much easier website creation has become”.</i></p> <p><i>“This [the new website] is less-time consuming to make updates than the last website tool we had”.</i></p> <p><i>“I can login and create new pages on my website”.</i></p>	<p><i>“It is about five minutes faster on boot-up; it is way faster than our previous machine.”</i></p>
<b>Competitiveness and Access to New Markets / Poverty Reduction</b>	
<p><i>“The website showed us that people are looking at it and calling us about our services.”</i></p>	

“This [the website tool] is so much more economical to maintain a website”.	
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**Table 3. ICT impact categorizations**

### **Case 1: AC (Carpet cleaning business)**

With regards to **Administrative Efficiency**, AC has begun an electronic-based customer record system using *Microsoft Excel*. AC has made substantial progress on this system; however records are still being written down on physical paper, if her husband gets a call from a customer. If she answers a call, she will write it down on paper for her husband, and also input the records in the electronic system. Although redundant, the owner of AC still wants to maintain an up to date email list as she tries to remind her husband to transfer over paper records to electronic records. In terms of **Learning and Labor Productivity**, AC is still using their new website and has been updating it periodically. In fact, the owner is setting up a new website by herself for a new service that her company will be providing – air duct cleaning. The owner is also spreading her ICT knowledge to her husband, the other employee at AC. AC has also experienced time-saving in terms of updating their new website. Prior to the new website tool, the owner would spend hours trying to figure out the code on how updating the homepage. Now, within minutes, the owner can update images and text on any webpage. With the user-friendly website builder, AC saves time and the headache of making text edits and creating new pages on their new website. Regarding, **Competitiveness and Access to New Markets / Poverty Reduction**, since the new website launch, AC has seen an increase in customers. AC knew they were brought in from the website because customers would directly say something like, “from your website, I saw ....” The owner of AC was overjoyed that her website was being used by real customers. AC also discussed how this new website building tool saved them money. On a monthly basis, AC was saving about \$20 on web hosting costs. This saving is a form of poverty reduction for the business. Due to the sudden burst of customers; AC was also able to update their cleaning equipment with the profits they gained. They hope to hire an additional employee due to the present workload. AC appears to be growing as a business and continuing to use their ICT. In terms of **Access to Knowledge and Expertise**, the owner of AC discussed how search engines and social media are much more useful for her now. On social media, the owner can view what other competitors’ prices are and how they are marketing to customers. This gives AC a much better way to benchmark. The owner of AC also stated how she is using her smartphone more often to browse the web, rather than just checking emails. She is using this to look up costs of new equipment and learning how to add a payroll system into her business (since she is planning to hire a new employee soon).

### **Case 2: RP (Florist)**

With regards to **Administrative Efficiency**, the main area of impact for RP was in administrative efficiency. The new computer is being used on a daily basis and the owner always checks the business email on it. He has noticed how much more timely it was to boot up the computer, go to the Internet, and then access his email. This computer is used by several employees throughout the day, and they are more satisfied with this machine than the previous one. This new machine allowed users to open up multiple browsers and multiple tabs without freezing up. Employees also enjoy the fact that they can listen to music, check income emails, and carry out several business tasks without having to close out of each program before opening a new one. The owner of RP overall explained how this computer is making everything so much more efficient within his business. In terms of **Learning and Labor Productivity**, with the new computer, RP has been more productive in their tasks. The computer does not cause any headache among the staff and every task that was computerized can now be done more quickly. This involves using the Internet, RP’s custom POS system, booting up the computer and running any other software, such as word and spreadsheet processors. In all, this saves time for carrying out business tasks and keeps the employees and owner satisfied. The owner of RP also began some research in antivirus programs. He is satisfied with his free programs from the IT assistance team, but he is now learning more about viruses and the affects they can have on a computer and laptop. He has taught all his employees how to run the virus scanner, just in case he was not around to do it. The owner said the staff is very confident in using the scanning software and know when to run it. Regarding **Competiveness and Access to New Markets**, RP is now considered more competitive than other local florists. They have an updated computer and a system to backup customer and business information. According to the owner, being able to backup data onto an external hard drive will not only allow storing more data, but also



protect vital data pertaining to the business, such as revenue histories and contact information for vendors. Having an organized and dedicated space for this information allows RP to operate without the headache of wondering what would happen if they lost electronic business files.

## Discussion

From the analysis of both microenterprise cases so far, it is apparent that through very simple yet contextualized ICT implementations, significant outcomes were achieved. In addition to the stated outcomes in Table 3, another very important observation is with regards to the micro-entrepreneur's attitude towards technology. The owner of AC stated,

*"I even plan on making a whole new website for another service that our business provides."*

*"I'm more willing to try new technology, it is less intimidating."*

It then appears from the above statements that the owner of AC has shown dramatic changes in terms of being in control of her technology. During AC's baseline assessment, the owner feared that technology could ruin her business and that it was complicated to her, but now she is embracing ICTs and her comfort to work with technology. Her ability to work with technology, after guidance, can show that with familiarity and access to the right tools, business owners without technical knowledge can still stay afloat with their technical competitors. Overall, the owner of AC found that technology, as powerful as it is, can cause positive effects on a business. After gaining access to user-friendly tools, the owner realized that technology is now being built for non-tech savvy users. The owner of AC went from fearing ICT to embracing it within a few months. Making a "complicated" process, such as building a website, can now be done through easy to use website builder tools.

Similarly, the following statements were made by the owner of RP:

*"I have pretty good working knowledge with technology, but this program [ICT assistance] solidified my understanding."*

*"It's a lot easier to promote a small business for a lot less money by doing it online"*

The owner of RP before and after the ICT assistance feels in control of the technology at RP. He believes that he knows where to find help in case no one else is around - he is tech savvy enough to properly search online. After the ICT assistance, the owner has gained more knowledge in virus scanning software and he has continued into researching the topic further in his own time. He has found several websites as resources for this topic and he believes he may try to use new software in the future to protect and scan his data. The owner of RP feels he can successfully run the technology within his business. The owner of RP remains to have a positive outlook towards technology. He is aware of the benefits it could bring to a business and understands how it should be continuously maintained. The owner of RP stated that the importance of ICT is an ongoing job that business owners need to be aware of and not neglect. If they refuse to accept and change technology, their business will likely suffer.

## Conclusion

This study described two very detailed microenterprise case studies that used a very systematic approach to adopting and using ICTs. A later visit to these two microenterprises revealed the continued use of the ICTs introduced earlier and most importantly a renewed positive attitude on the micro-entrepreneur's part. In both businesses, qualitative outcomes ranged from achieving efficiencies in administrative tasks to improved ability to market the respective businesses to a wider customer-base using websites. Technical skill and capacity building were other important outcomes observed. As the IT industry matures in the development and use of Cloud computing and other options for low cost technology products and services, resource-constrained micro-enterprises stand to benefit from such initiatives as evidenced in the two cases outlined in this research. Future research will entail quantifying the qualitative outcomes described in this paper by carrying out a longitudinal study and following the performance of these firms and correlating it to ICT adoption and use.

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